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Amendment and Response

Applicant: Savin Navin Chheda et al.

Serial No.: 10/684,768

Filed: October 14, 2003

Docket No.: 200308767-1 (H300.218.101)

Title: SERVER CARD POWER SWITCH

IN THE CLAIMS

Please add claims 20-28.

Please amend claims 1-6 and 13-20 as follows:

1. (Currently Amended) A server comprising:

a server card that is removably insertable into a server chassis and comprising at least one of a blade server and a brick server; and

an electronic switching mechanism disposed on the server card and configured to cause three power states of the server card including:

a fully-operational state in which a system power of the server card is enabled and a standby power of the server card is enabled;

a standby state in which the system power of the server card is disabled and the standby power of the server card is enabled; and

a shutdown state in which the system power of the server card is disabled and the standby power of the server card is disabled.

2. (Currently Amended) The server of claim 1 wherein the server card and further comprising comprises:

a server management circuitry configured for communication with the electronic switching mechanism for managing the power states of the server card, ~~and wherein the server card comprises at least one of a blade server and a brick server.~~

3. (Currently Amended) The server of claim 1 wherein the electronic switching mechanism comprises:

a tristate electronic switch including;

a first switch state configured to enable the system power of the server card and to enable the standby power of the server card;

a second switch state configured to disable the system power of the server card and to enable the standby power of the server card; and

a third switch state configured to disable the system power of the server card and to disable the standby power of the server card.

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4. (Currently Amended) The server of claim 1 wherein the electronic switching mechanism comprises:

a first electronic two-state switch and a second push button switch disposed on the at least one server card and together defining three power states of the server card including:

a first fully operational state of the server card corresponding to the first electronic switch being closed and the second push button switch being enabled, thereby enabling both the system power of the server card and the standby power of the server card, and the enabled second push button switch activating a locking mechanism to physically secure the server card relative to the chassis;

a second standby state of the server card corresponding to the first electronic switch being open and the second push button being enabled, thereby disabling the system power of the server card and enabling the standby power of the server card, and enabled second push button switch activating the locking mechanism to physically secure the server card relative to the chassis; and

a third full shutdown state corresponding to the first electronic switch being open and the push button being disabled, thereby disabling both the system power of the server card and the standby power of the server card and deactivating the locking mechanism to physically release the server card relative to the chassis.

5. (Currently Amended) The server of claim 1 wherein the electronic switching mechanism comprises:

a first latch switch and a second latch switch disposed on the server card with each latch switch configured for removably securing the server card to the chassis and configured for managing three power states of the server card including:

a fully operational state corresponding to the first latch switch being in a closed position physically securing the server card relative to the chassis and electronically causing the system power of the server card to be enabled and corresponding to the second latch switch being in a closed position physically securing the server card relative to the chassis and electronically causing the standby power of the server card to be enabled;

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a standby state corresponding to the first latch switch being in an open position physically releasing the server card relative to the chassis at the first latch switch and electronically causing the system power of the server card to be disabled, and corresponding to the second latch switch being in a closed position physically securing the server card relative to the chassis and electronically causing the standby power of the server card to be enabled; and

a shutdown state corresponding to the first latch switch is in an open position physically releasing the server card relative to the chassis and electronically causing the system power of the server card to be disabled, and corresponding to the second latch switch is in an open position physically releasing the server card relative to the chassis and causing the standby power of the server card to be disabled, thereby permitting removal of the server card relative to the chassis.

6. (Currently Amended) The server of claim 1 wherein the electronic switching mechanism comprises:

a first electronic two-state switch and a second latch switch disposed on the at least one server card and together defining three power states of the server card including:

a first fully operational state of the server card corresponding to the first electronic switch being closed and the second latch switch being closed, thereby enabling both the system power of the server card and the standby power of the server card with the second latch switch physically securing the server card to the chassis;

a second standby state of the server card corresponding to the first electronic switch being open and the second latch switch being closed, thereby disabling the system power of the server card and enabling the standby power of the server card with the second latch switch physically securing the server card to the chassis; and

a third full shutdown state corresponding to the first electronic switch being open and the second latch switch being open, thereby disabling both the system power of the server card and the standby power of the server card with the second latch switch permitting physical removal of the server card relative to the chassis.

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7. (Original) The server of claim 1 and further comprising:

an locking mechanism disposed on the server card and configured to be in communication with the electronic switching mechanism so that when the electronic switching mechanism causes the server card to be in the fully operational state and the standby state, the electronic locking mechanism is electrically activated to physically prevent removal of the server card from the chassis, and when the electronic switching mechanism causes the server card to be in the fully shutdown state, the locking mechanism is electrically deactivated to permit removal of the server card from the chassis.

8. (Original) The server of claim 7 and further comprising:

a management server card removably insertable into the chassis and configured for communication with the server card, and configured to electrically activate the locking mechanism when the server card is in the fully shutdown state to physically lock the server card to the chassis.

9. (Original) The server of claim 1 and further comprising:

an operating system stored in a memory of the server card; and
a watchdog timer in communication with the operating system and configured to be activated upon a transition from the fully operational state of the server card to the standby state of the server card and configured to cause the operating system to shut down, prior to the system power of the server card being disabled, in the event that operating system does not shutdown within a predetermined period of time.

10. (Original) The server of claim 9 and further comprising:

a server management circuitry in communication with the watchdog timer and configured to monitor progress of the shutdown of the operating system.

11. (Original) The server of claim 1 wherein the chassis includes a system power and a standby power and the electronic switching mechanism is electrically coupled to the system power and the standby power of the chassis for activating the system power and the standby power of the server card via the electronic switching mechanism.

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12. (Original) The server of claim 1 wherein the server card comprises an electronic user interface configured for communication with the switching mechanism to cause switching between the power states of the server card.

13. (Currently Amended) A method of managing power for a at least one server card, the method comprising:

removably inserting at least one server card within a server chassis;

operating an electronic switching mechanism on the at least one server card to

alternately:

activate, via a first state of the electronic switching mechanism, a fully-operational state of the at least one server card, in which a system power of the ~~blade~~ at least one server card is enabled and a standby power of the ~~blade~~ at least one server card is enabled;

activate, via a second state of the electronic switching mechanism, a standby state of the at least one server card, in which a system power of the ~~blade~~ at least one server card is disabled and a standby power of the ~~blade~~ at least one server card is enabled; and

activate, via a third state of the electronic switching mechanism, a fully shutdown state of the at least one server card, in which a system power of the ~~blade~~ at least one server card is disabled and a standby power of the ~~blade~~ at least one server card is disabled.

14. (Currently Amended) The method of claim 13 and further comprising:

preventing removal of the at least one server card from the server chassis during the fully operational state and the standby state of the at least one server card by activating at least one of an electrically activatable locking mechanism and a mechanically activatable locking mechanism for physically securing the at least one server card relative to the server chassis.

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15. (Currently Amended) The method of claim 13 wherein operating the electronic switching mechanism comprises:

operating a tri-state electronic switch in which a first position of the tristate switch corresponds to the fully operational state of the at least one server card, a second position of the tristate switch corresponds to the standby state of the at least one server card, and a third position of the tristate switch corresponds to the shutdown state of the at least one server card.

16. (Currently Amended) The method of claim 13 wherein operating the electronic switching mechanism comprises:

operating a two-state electronic switch and an unlock button switch to:

activate the fully operational state of the at least one server card by closing the two-state switch to enable the system power of the at least one server card and position the unlock button switch to enable the standby power of the at least one server card and to physically secure the at least one server card relative to the server chassis,

activate the standby state of the at least one server card by opening the two-state switch to disable the system power of the at least one server card and position the unlock button to enable the standby power of the at least one server card ~~and to enable standby power~~ and to physically secure the at least one server card relative to the server chassis; and

activate the shutdown state of the at least one server card by opening the two-state switch to disable the system power of the at least one server card and position the unlock button to disable the standby power of the at least one server card and to physically release the at least one server card relative to the server chassis.

17. (Currently Amended) The method of claim 13 wherein operating the electronic switching mechanism of the at least one server card comprises:

activating the fully operational state of the at least one server card by closing a first latch switch of the at least one server card to physically secure the at least one server card relative to the server chassis and to electronically cause the system power

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of the at least one server card to be enabled and by closing a second latch switch of the at least one server card relative to the server chassis and to cause the standby power of the at least one server card to be enabled, thereby preventing removal of the at least one server card relative to the server chassis;

activating the standby state of the at least one server card by opening the first latch switch of the at least one server card and electronically causing the system power of the at least one server card to be disabled, and by closing the second latch switch of the at least one server card to physically secure the at least one server card relative to the server chassis and to cause the standby power of the at least one server card to be enabled, thereby preventing removal of the at least one server card relative to the server chassis; and

activating the fully shutdown state of the at least one server card by opening the first latch switch of the at least one server card to physically release the at least one server card relative to the server chassis and to electronically cause the system power of the at least one server card to be disabled, by opening the second latch switch of the at least one server card to physically release the at least one server card relative to the server chassis and to electronically cause the standby power of the at least one server card to be disabled, and thereby permitting removal of the at least one server card relative to the server chassis.

18. (Currently Amended) The method of claim 13 wherein operating the electronic switching mechanism to activate a standby state comprises:

requesting, via a power management module, disabling the system power of the at least one server card in response to a power event of the switching mechanism transitioning from the fully shutdown state to the standby state, thereby triggering a shutdown of an operating system of the at least one server card;

shutting down the system power of the at least one server card after a shutdown of the operating system; and

triggering, via a watchdog timer, disabling the system power of the at least one server card within a predetermined period of time in the event that the operating system fails to shutdown.

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19. (Currently Amended) A power state manager for a server card comprising:

means for electronically disabling and enabling a system power and a standby power of a server card to manage three power states of the server card; and

means for physically securing the server card relative to the chassis in a first power state when the system power of the server card and the standby power of the server card are enabled and in a second power state when the standby power is enabled.

20. (Currently Amended) The power state manager of claim 19 wherein the means for electronically disabling and enabling comprises at least one of:

an electronic tristate switch;

a pair of two-state switches;

a two-state switch and a push button lock; and

a pair of latch switches; and

wherein the means for enabling and disabling comprises:

a watchdog timer configured to perform a shutdown of the system power in the event that an operating system of the server card fails to shutdown upon transition between the three different power states of the server card.

21. (New) A server comprising:

a server card that is removably insertable into a server chassis;

a tristate electronic switch disposed on the server card and including:

a first switch state to cause the server card to be in a fully operational state in which a system power of the server card is enabled and in which a standby power of the server card is enabled;

a second switch state to cause the server card to be in a standby state in which the system power of the server card is disabled and the standby power of the server card is enabled; and

a third switch state to cause the server card to be in a shutdown state in which the system power of the server card is disabled and the standby power of the server card is disabled.

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22. (New) A server comprising:

- a server card that is removably insertable into a server chassis;
- an electronic switching mechanism disposed on the server card and comprising a first electronic two-state switch and a second push button switch disposed on the at least one server card and together defining three power states of the server card including:
 - a first fully operational state of the server card corresponding to the first electronic two-state switch being closed and the second push button switch being enabled, thereby enabling both a system power of the server card and a standby power of the server card, and the enabled second push button switch activating a locking mechanism to physically secure the server card relative to the chassis;
 - a second standby state of the server card corresponding to the first electronic two-state switch being open and the second push button being enabled, thereby disabling the system power of the server card and enabling the standby power of the server card, and the enabled second push button switch activating the locking mechanism to physically secure the server card relative to the chassis; and
 - a third full shutdown state corresponding to the first electronic two-state switch being open and the second push button being disabled, thereby disabling both the system power of the server card and the standby power of the server card and deactivating the locking mechanism to physically release the server card relative to the chassis.

23. (New) A server comprising:

- a server card that is removably insertable into a server chassis;
- an electronic switching mechanism disposed on the server card and comprising a first latch switch and a second latch switch with each respective latch switch configured for removably securing the server card to the chassis and configured for managing three power states of the server card including:
 - a fully operational state corresponding to the first latch switch being in a closed position physically securing the server card relative to the chassis and electronically causing a system power of the server card to be enabled and

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corresponding to the second latch switch being in a closed position physically securing the server card relative to the chassis and electronically causing a standby power of the server card to be enabled;

a standby state corresponding to the first latch switch being in an open position physically releasing the server card relative to the chassis at the first latch switch and electronically causing the system power of the server card to be disabled, and corresponding to the second latch switch being in a closed position physically securing the server card relative to the chassis and electronically causing the standby power of the server card to be enabled; and

a shutdown state corresponding to the first latch switch being in an open position physically releasing the server card relative to the chassis and electronically causing the system power of the server card to be disabled, and corresponding to the second latch switch being in an open position physically releasing the server card relative to the chassis and causing the standby power of the server card to be disabled, thereby permitting removal of the server card relative to the chassis.

24. (New) A server comprising:

a server card that is removably insertable into a server chassis;

an electronic switching mechanism disposed on the server card and comprising a first electronic two-state switch and a second latch switch disposed on the at least one server card and together defining three power states of the server card including:

a first fully operational state of the server card corresponding to the first electronic switch being closed and the second latch switch being closed, thereby enabling both a system power of the server card and a standby power of the server card with the second latch switch physically securing the server card to the chassis;

a second standby state of the server card corresponding to the first electronic switch being open and the second latch switch being closed, thereby disabling the system power of the server card and enabling the standby power of the server card with the second latch switch physically securing the server card to the chassis; and

a third full shutdown state corresponding to the first electronic switch being open and the second latch switch being open, thereby disabling both the system power

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of the server card and the standby power of the server card with the second latch switch permitting physical removal of the server card relative to the chassis,

25. (New) A server comprising:

a server card that is removably insertable into a server chassis;

an electronic switching mechanism disposed on the server card and configured to cause three power states of the server card including

a fully-operational state in which a system power of the server card is enabled and a standby power of the server card is enabled;

a standby state in which the system power of the server card is disabled and the standby power of the server card is enabled; and

a shutdown state in which the system power of the server card is disabled and the standby power of the server card is disabled; and

a locking mechanism disposed on the server card and configured to be in communication with the electronic switching mechanism so that when the electronic switching mechanism causes the server card to be in the fully operational state and the standby state, the electronic locking mechanism is electrically activated to physically prevent removal of the server card from the chassis, and when the electronic switching mechanism causes the server card to be in the fully shutdown state, the locking mechanism is electrically deactivated to permit removal of the server card from the chassis.

26. (New) The server of claim 25 and further comprising:

a management server card removably insertable into the chassis and configured for communication with the server card, and configured to electrically activate the locking mechanism when the server card is in the fully shutdown state to physically lock the server card to the chassis.

27. (New) A server comprising:

a server card that is removably insertable into a server chassis, the server chassis including a system power and a standby power;

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an electronic switching mechanism disposed on the server card and electrically coupled to the system power and the standby power of the chassis, the electronic switching mechanism configured to cause three power states of the server card including:

a fully-operational state in which a system power of the server card is enabled and a standby power of the server card is enabled;

a standby state in which the system power of the server card is disabled and the standby power of the server card is enabled; and

a shutdown state in which the system power of the server card is disabled and the standby power of the server card is disabled.

28. (New) A method of managing power for a server card, the method comprising: removably inserting at least one server card within a server chassis; operating an electronic switching mechanism on the at least one server card to alternately:

activate, via a first state of the electronic switching mechanism, a fully-operational state of the at least one server card, in which a system power of the at least one server is enabled and a standby power of the at least one server card is enabled;

activate, via a second state of the electronic switching mechanism, a standby state of the at least one server card, in which a system power of the at least one server card is disabled and a standby power of the at least one server card is enabled, wherein activating the standby state comprises:

requesting, via a power management module, disabling the system power of the at least one server card in response to a power event of the switching mechanism transitioning from the fully shutdown state to the standby state, thereby triggering a shutdown of an operating system of the at least one server card;

shutting down the system power of the at least one server card after a shutdown of the operating system; and

triggering, via a watchdog timer, disabling the system power within a predetermined period of time in the event that the operating system fails to shutdown; and

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activate, via a third state of the electronic switching mechanism, a fully shutdown state of the at least one server card, in which a system power of the at least one server card is disabled and a standby power of the at least one server card is disabled.